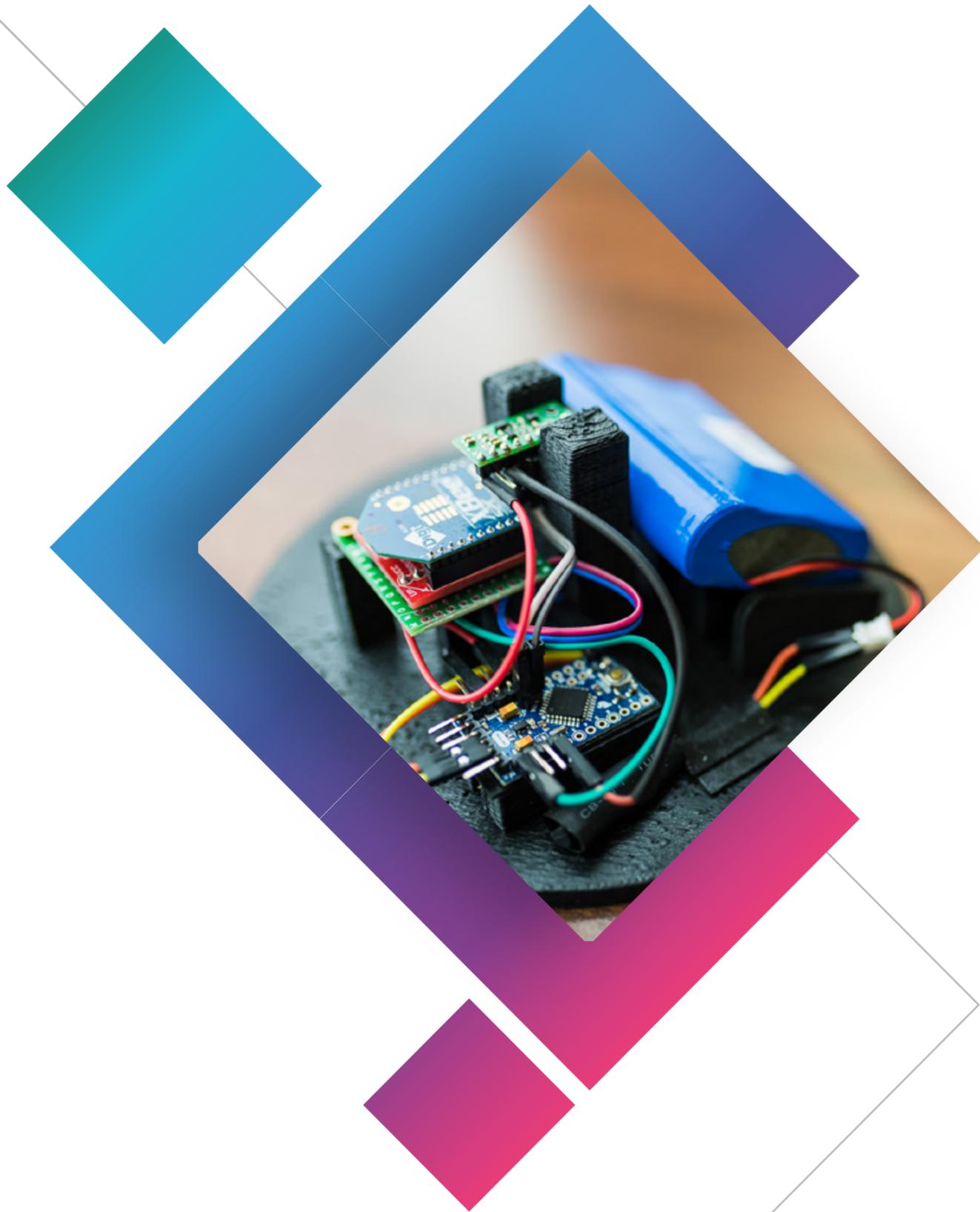


# SMART PARKING PROTOTYPE

Creating a Real-Time Parking  
Space Availability Detection

Mastery in  
Software  
Engineering

**FORTECH.**



## Key Facts

 Industry: Internet of Things

 Team Size: 6 People

 Duration: 6 Months

 Technologies:  
Embedded C/C++ (Arduino),  
C# Controller logic (Raspberry Pi),  
Java REST Webservices,  
Mobile application (Android)

 Trends: Smart Parking

## Highlights

- Intelligent parking system for detecting in real-time available parking spaces.
- It relies on an Arduino Uno board, a geomagnetic sensor, a ZigBee radio module and a 9 Volt battery.
- The solution was created from scratch by an R&D team at Fortech.



# PROTOTYPE

This is a prototype an intelligent parking system for detecting free parking spaces based on a sensor network, developed internally at Fortech.

Our goal was to make each parking space 'aware' of its state - occupied or not - and relay that information to a central server. We put together an enthusiastic Agile development team and started working.

The system was built using an Arduino Uno board, a geomagnetic sensor for detecting the presence of a vehicle, a ZigBee radio module for communications and a 9 Volt battery to power it all.

Basically, each parking space receives a wireless battery operator sensor, which captures data and provides car drivers with real-time information about parking availability. The parking spaces create a wireless sensor network and publish their status through a web server by using a controller. The information is displayed on a web or mobile application. The connectivity relies on low-power, auto-configurable wireless mesh networks.

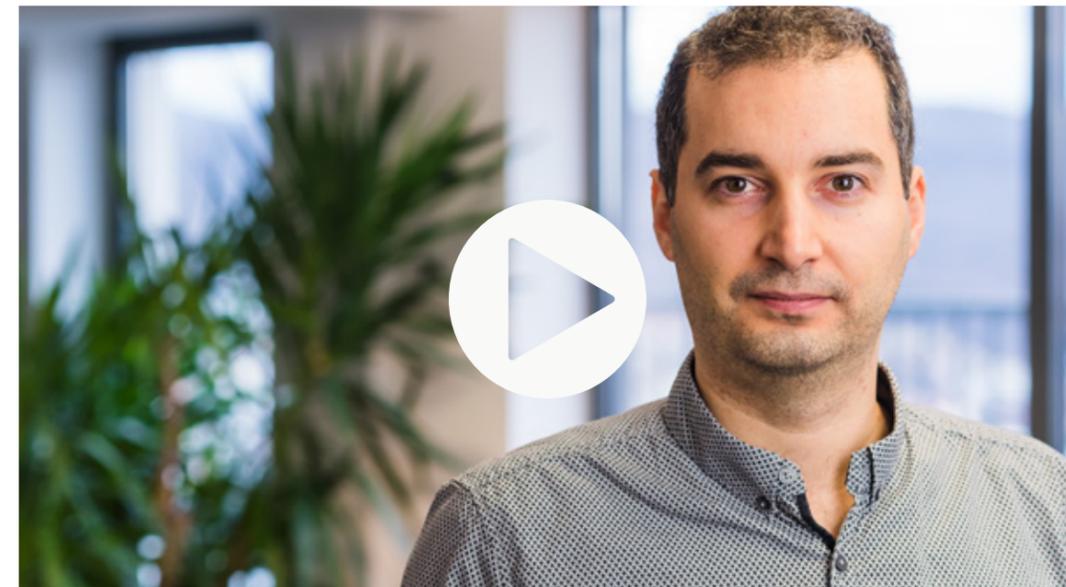


# IMPLEMENTATION

The biggest challenge was to tune the car-detection algorithm running on the end device. We needed to make sure that the geomagnetic sensor detects all vehicle shapes, sizes and compositions (whether metal or plastic, big or small and so on), and is immune regarding other vehicles' presence in its vicinity.

Version two is in work. It addresses low-energy and long-lifetime criteria. We will move from the Arduino Uno board to another one, having just the microcontroller and switching everything to low-voltage. We are also considering a higher capacity battery and deep-sleep modes for all the components.

We want to take this one step further and build use cases on top of this platform, such as: reserving a parking space in advance or putting a beacon inside of the car to identify the user and handle automatic payments.





# ABOUT FORTECH

Fortech is a Romanian software development company headquartered in Cluj-Napoca. Employing more than 700 software engineers and growing, Fortech is one of the largest software outsourcing providers in the region, repeatedly included in Deloitte rankings of the fastest growing technology companies in Central and Eastern Europe.

Fortech provides full stack custom software development and software testing services, with focus on solutions for Automotive, Healthcare, eCommerce and the Internet of Things. Since 2003, two hundred clients chose Fortech as their software engineering partner, among which T-Systems, Swisscom, Symantec, Pfizer and Renault.

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